

CLAIMS

1. A lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in that the substantial surface area of the current collector of at least one of said negative electrode and positive electrode is two or more times as large as the apparent surface area.
2. A lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in that provided that the discharge capacity after conducting discharge at a discharge current of 400 mA, an upper limit voltage of 4.2 V and a lower limit voltage of 2.5 V is 100%, the discharge capacity after conducting 200 cycles of said

charge and discharge is 85% or more based on the above criterion.

3. A lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in that in the current collector of at least one of said negative electrode and positive electrode, a bar-like metal layer made of a metal composing said negative electrode or positive electrode is formed on the surface of said current collector where said negative electrode or positive electrode active material is formed.

4. A lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in that said negative

electrode active material comprises flake graphite or a bulk amorphous carbon powder and a metallic powder.

5. A lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in that the current collector of at least one of said negative electrode and positive electrode is made of a cold-rolled thin metallic plate.

6. A lithium secondary battery according to any one of claims 1 to 5, wherein at least one of current collectors of negative electrodes and positive electrodes has on its surface a layer of a metal having higher hardness than that of the base metal of said collector.

7. A lithium secondary battery according to any one of Claims 1 to 5, wherein at least one of said negative electrode active material and positive electrode active material contains graphite comprising 20% by weight or less of rhombohedral system crystal and 80% by weight or more of hexahedral system crystal.

8. A process for producing a lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin

9. The process according to Claim 8, which further comprises a step in which before forming said active material on the current collector surface which has been subjected to said reducing treatment, a coating film of a metal harder than the metal of said current collector is formed on said surface.

10. A process for producing a lithium secondary battery comprising a negative electrode having a negative electrode active material on the surface of a current collector made of a thin metallic plate, said active material occluding or releasing lithium ions during charge or discharge of the battery, a positive electrode having a positive electrode active material on the surface of a current collector made of a thin metallic plate, and a lithium ion conductive non-aqueous electrolyte or a polymeric electrolyte, characterized in said process comprises a step in which after the current collector comprising a thin metallic plate of at least one of said negative electrode and positive electrode has been worked into a desired thickness by cold

rolling, the worked surface is roughened and said active material is formed on this surface.

11. A composite member comprising a metallic plate having formed on its surface a thin layer made of a mixture of an inorganic powder and a resin,
- 5 characterized in that a bar-like metal layer composed of the metal of said metallic plate is formed on the surface side of said metallic plate where said thin layer is formed.

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